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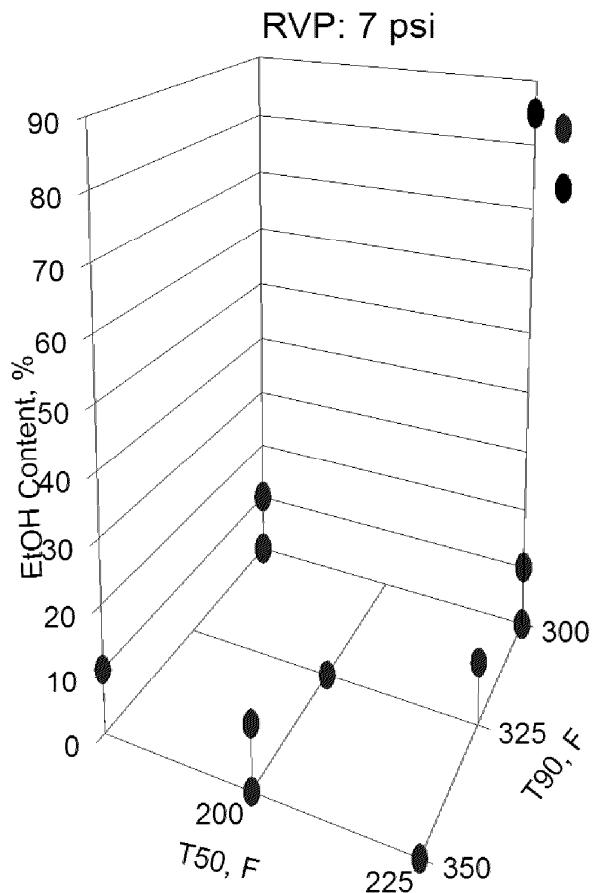
EPAct Program

Fuel Matrix Design Options

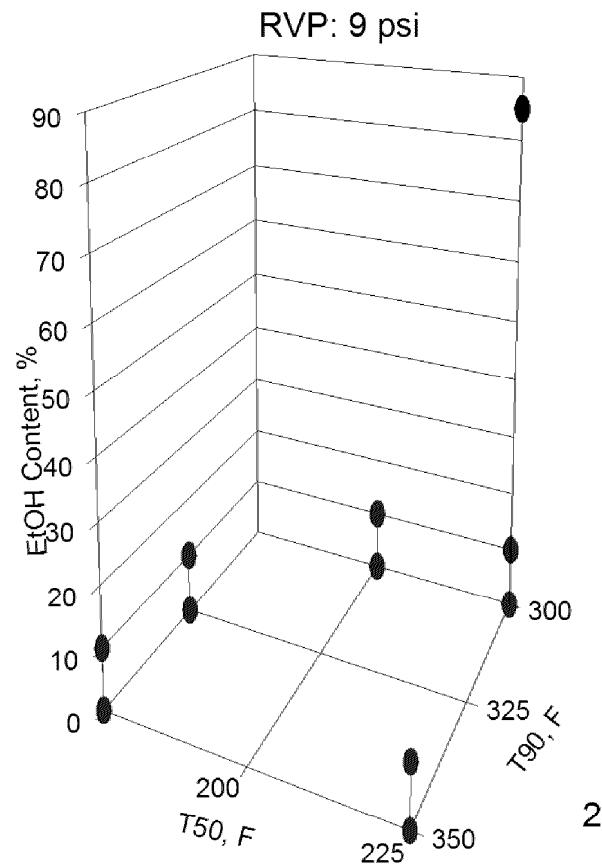
July 18, 2007

Fuel Matrix No. 1

(4 variable, mixed level)



- Computer generated optimal design
 - 20 fuels
 - G-Efficiency*: 86.4%
- * >60% considered satisfactory

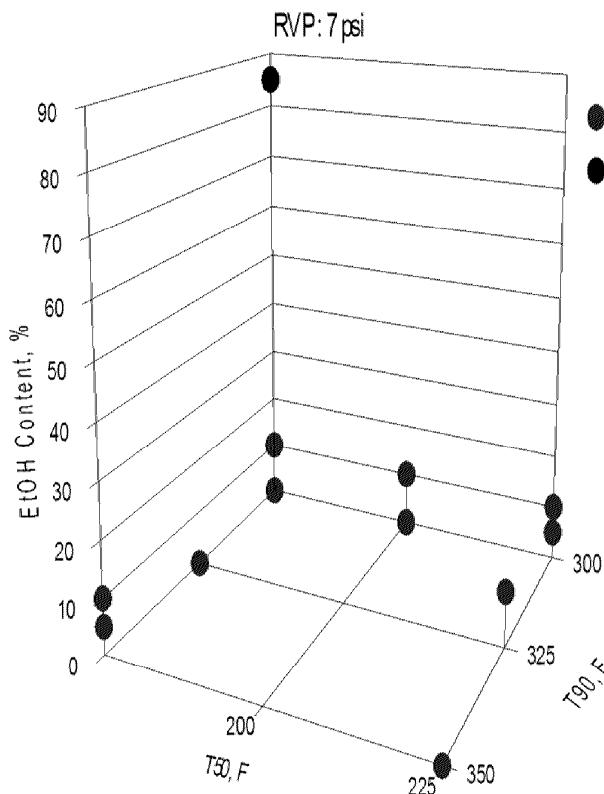


Fuel Variables	#of Levels	Tens in Model
T50	3	Main effects T ₅₀ ² , T ₉₀ ² , T ₅₀ EtOH, T ₉₀ EtOH, RPEtOH
T90	3	
EtOH	2	
RPEtOH	2	

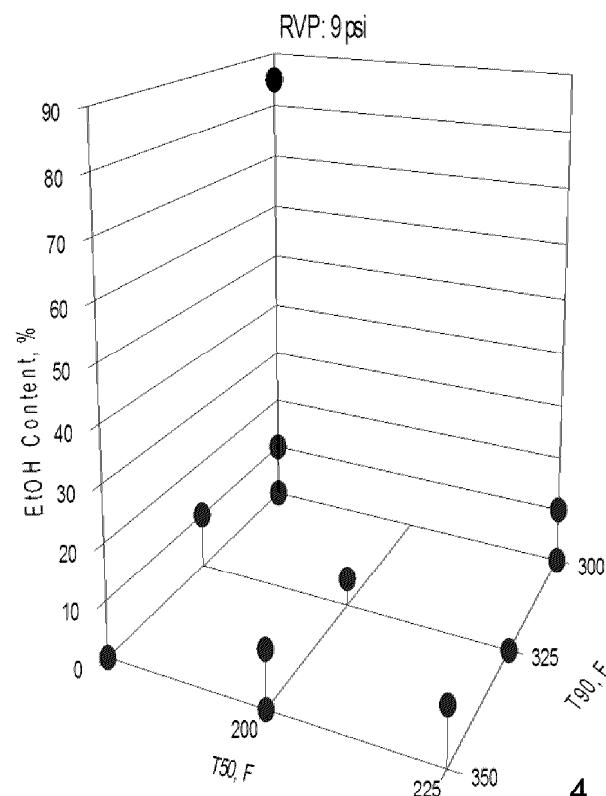
Ex. 5 - Deliberative/Ex. 4 CBI

Fuel Matrix No.1a

(4 variable, mixed level)



- Computer generated optimal design
 - 21 fuels
 - G-Efficiency*: 87.7%



Fuel Matrix Design

Fuel Variables	# of Levels	Terms in Model
T50	3	Main effects
T90	3	$T50^2, T90^2$
EOH	(3)	$(EOH)^2$
RP	2	$T50EOH, T90EOH, RPEOH$

Ex. 5 - Deliberative/Ex. 4 CBI

Options

- Remove RVP from EPAct Program
 - Use E-74b data instead
- Remove T50 and T90
????????????????
 - Use E-67 data instead
- Remove FFV tests at E>10
 - Use E-80 data instead
- Remove high emitters
- Remove 50°F test temperature
- Expand program to include E20 via DOE support

CRC Program E-67

- Title: Effects of Ethanol and Volatility Parameters on Exhaust Emissions
- Status: Completed
- Fuel parameters investigated: T50 (195, 215, 235°F), T90 (295, 330, 355°F), ethanol (0, 5.7, 10%)
- Test vehicles:
 - 6 CA cert. LEVs, incl. 3 LDTs
 - 5 CA cert. ULEVs, incl. 2 LDTs
 - 1 CA cert. SULEV LDV
 - 5 LDVs at Tier 2 emission levels
- Test cycle: FTP
- Exhaust constituents measured: NMHC, CO, NOx, selected toxics for 4 vehicles
- Exhaust constituents not measured: PM, sec/sec emissions

CRC Program E-74b

- Title: Effect of Vapor Pressure and Temperature Parameters on CO Exhaust Emissions
- Status: In –progress (~50% done)
 - Completion expected in 3Q 2007
- Fuel parameters investigated: RVP (7-9(13) psi), ethanol (0, 10, 20%)
- Test vehicles:
 - 3 Tier 1s, incl. 1 LDT
 - 5 NLEVs, incl. 2 LDTs
 - 7 Tier 2s, incl. 3 LDTs
- Test cycle: FTP at 75 and 50°F
- Exhaust constituents measured: NMHC, CH₄, CO, NOx
- Exhaust constituents not measured: PM, toxics, sec/sec emissions

CRC Program E-80

- Title: Exhaust and Evaporative Emissions Testing of Flexible Fuel Vehicles
- Status: To be launched in 4Q 2007
 - Expected program duration: 18 months
- Test Fuels:
 - Commercial CA E6
 - Commercial CA E85
 - Up to 3 co-mingled blends of E6 and E85
- ~ 10 CA-certified, late-model FFVs
- Test cycles: FTP, SFTP, LA92, two-day CA diurnal incl. hot soak test
- Exhaust constituents measured: NMHC, CH₄, CO, NOx, toxics, sec/sec emissions (?)
- Exhaust constituents not measured: PM